THE TOXIC ORIGIN OF INSANITY.[1]

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TWENTY-FIVE years ago comparatively few cases of insanity were recognized to be of toxic origin. Modern research and clinical observation on the part of many specialists in nervous and mental diseases have established the fact that a considerable percentage of all mental disorders can be said to have a toxic etiology.

Whenever a poison enters the human system, and through its presence, directly or indirectly, causes prolonged derangement of the mental functions, it is but reasonable to call the insanity toxic, and to regard the deleterious substance as the exciting cause of the disease. It is true of this exciting cause, as of all others, that it will act only in cases having a native instability of nervous centres.

The toxic agent may be vegetable, animal or mineral. It may be solid, liquid or gaseous. It may be generated as an organic virus in the bodies of others, or it may originate through metabolic tissue changes in the patient himself, as in the auto-intoxications.

The poisonous substance may gain access to the system through the alimentary canal by the respiratory tracts, or through the cutaneous surface, and it may act by direct affinity on the cerebro-spinal centres, or the sympathetic nervous system, or through pathological changes which it produces in the blood, or in the internal organs.

The whole subject demands certain subdivisions in order that it may be studied to advantage, and the following arrangement of the toxic origin of insanities is merely offered as an aid to their systematic consideration.

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TABLE OF THE TOXIC ORIGIN OF INSANITY.

I. *From mineral poisons and certain drugs.*—1. lead; 2. mercury; 3. arsenic; 4. chloral; 5. bromide of potassium; 6. iodoform; 7. paraldehyde.

II. *From vegetable poisons.*—1. opium; 2. belladonna; 3. cannabis indica; 4. hyoscyamus; 5. stramonium; 6. tobacco; 7. cocaine; 8. conium; 9. erythroxylon coca; 10. astragalus hornii; 11. secale cornutum.

III. *From intoxicants and noxious gases.*—1. alcohol; 2. ether; 3. chloroform; 4. carbonic oxide; 5. sulphurous acid gas.

IV. *From eruptive fevers, diathetic states, and other diseases.*—1. typhoid fever; 2. small-pox; 3, scarlet fever; 4. intermittent fever; 5. rheumatism; 6. gout; 7. lithæmia; 8. puerperal state; 9. la grippe; 10. cancer; 11. syphilis; 12. tuberculosis.

V. *From auto-intoxications.*

This grouping is by no means exhaustive, though it gives a sufficient idea of the toxic sources of mental disorders.

It is by no means claimed that all of the toxic agents named give rise to distinct forms of mental disease, though a physician of wide experience would in many instances, by the clinical symptoms alone, differentiate between certain of the toxic insanities.

Time will not permit a description of the many ways in which the poisonous substances actually find their way into the system. It will suffice to simply mention adulterated food, impure water supply, and the numberless exposures to these noxious agents through special occupations.

It is of interest to note that the action of these agents is often most persistent, and continues long after the exposure, and that the variation in effects of the same agents in different individuals is very great. This individual idiosyncrasy is well illustrated in the instance of alcohol, which by some is borne in enormous quantities, while in others the smallest amount will derange mental action.

Most of the toxic agents mentioned may start a long train of somatic or psychic disturbances, and either set of symptoms may predominate or alternate with the other.

It would exceed the limits of this article to describe the characteristics of the toxic insanities, but some passing remarks will be made as to the action of the morbific agents in the order in which they are above grouped.

Attention is first invited to the group of mineral poisons.

In recent and severe cases of lead poisoning the mental derangement is apt to take the form of mania, with rapidly changing hallucinations, but in the more usual and chronic cases of plumbism there is a decided tendency to dementia, which in consideration of the motor symptoms, and convulsive attacks may somewhat resemble general paresis. The prognosis in the latter cases is unfavorable, not only as to mental recovery, but also as to life.

Mercury, which is a less frequent cause, is more apt to give rise to acute than to chronic forms of mental disorder, and the prognosis is correspondingly more favorable.

In cases from arsenic, the widest variation, in both physical and mental symptoms, is to be observed, and either exaltation, depression or weakness of mind may prevail.

Chloral has become a not uncommon exciting cause of mental disorder, as well as a complication in many cases of insanity in which it has been used to excess.

The dementia brought about by the abuse of bromide of potassium, is too well known to require comment here. It is accompanied in some cases by well-marked paralytic symptoms, and the damage sustained by cortical centres is so permanent in some instances that on cessation of the drug a hopeless hebetude will still remain.

Disorders of psychic functions from the toxic influence of iodoform have been reported in Germany, more especially.

Distressing forms of mental derangement have been known to arise from excessive use of paraldehyde.

The vegetable poisons of the second group above given are a most prolific cause of insanity.

The forms of mental disease arising from the poisonous effects of opium are too familiar to require description here.

In this regard opium is almost as great a curse in Eastern countries as alcohol is in the United States and Europe: According to all accounts there is a constant increase in the abuse of this drug in all parts of the civilized world.

The etiological relation of belladonna to mental disease has been recognized in several instances, and some cases have also been reported as due to atropine.

In some Eastern countries a considerable portion of all cases of insanity have been attributed to the toxic effects of cannabis indica. This drug is chiefly smoked in pipes, and it is known to be consumed in enormous quanties, and the artificial appetite thus generated is probably as powerful as that of opium or alcohol. The insanity caused by cannabis indica is said to be acute, with active sensorial disturbances, but with a diret tendency to dementia, which not unfrequently proves to be terminal.

Other vegetable poisons reported to have borne a causative relation to insanity are hyoscyamus, stramonium and tobacco. The latter substance may become the exciting cause of mental disorder in youths addicted to great excess in cigarette smoking. Tobacco excess is also an unfavorable complicating cause in a great many cases of insanity, so much so, that it is impossible often to say what portion of the symptoms are due to its influence until it is completely excluded from the case.

Cocaine exerts a fatal fascination over its victims, and there can be no doubt but that it may be the exciting cause of mental disorder in predisposed cases.

In South America the leaves of erythroxylon coca are chewed. They contain hygrine and cocaine with cocatanic acid. This habit is very common, and is carried to such excess that insanity sometimes results.

Astragalus hornii is a plant familiarly known as the loco-weed. It grows in the south-western United States, and in California and Mexico. It produces, when eaten by cattle, a long series of symptoms referable to disordered nervous centres, and finally the animals become so strange in their actions, that they are said to be insane, or "locoed," from the Spanish word "loco," which means insane. The action of this plant is well known to the natives, and especially among the Indians it is reported in some cases to have been used, and to have caused permanent mental impairment.

In the epidemics of ergotism which have appeared from time to time in Europe nervous and mental disorders have been prominent symptoms. The active and toxic agent in these cases is the the sclerotium of Claviceps purpurea, which grows on secale cereale. This toxic vegetable growth probably acts in a somewhat similar way to the parasite fungus on maize, which as an article of diet in Italy, more especially, acts with other causes to produce what is termed pellogrous insanity.

In the group of intoxicants and noxious gases, the first substance to engage attentation is alcohol.

It is impossible to estimate, even with approximate exactitude, the proportion of cases of insanity which originate from the toxic effects of alcohol.

Twenty per cent. of all cases of insanity were once supposed to proceed either directly from alcoholic abuse or indirectly from alcoholic parentage, but this is probably a high figure.

The main fact, however, remains, that alcohol in some of its seductive forms, is the cause of a great deal of mental disorder.

The relation which ether or chloroform bears to insanity is no longer doubtful, as it is well known that a chronic ether or chloroform-habit may end in decided mental disorder.

The relation between cause and effect is not so clear in maniacal outbreaks immediately following the administration of chloroform or ether for surgical purposes.

The writer recalls two instances of insanity following the extraction of teeth under anæsthetics. In cases of this kind it would be arbitrary to attempt to estimate to what degree the gas rather than trauma acted as an exciting cause, especially as traumatic influences in the area of the sensory trigeminal distribution are of all others most likely to provoke mental disturbances. The action of carbonic oxide, of sulphurous acid gas, and of ordinary illuminating gas, is of a sufficient toxic and permanent nature to cause disorder of the mental functions.

In the instance of carbonic oxide generated in the presence of a high degree of heat, the exposure to the latter is to be taken into account as a subsidiary cause.

The next group of eruptive fevers and of diathetic states has less apparent, though none the less real causative relations to toxic insanity.

The special poison, which in typhoid fever causes the parenhcymatous changes in the spleen, heart, liver and kidneys, also occasions lesions in the cerebral nervous centres of such a nature as to determine the mental disturbances. The psychic disorders which arise in the incubatory stage of the fever are the direct result of the special poison in the blood, and may consistently be termed toxic in origin. Likewise in the incubatory stage of small-pox toxic maniacal outbreaks may be occasioned by the direct action of the variolous poison.

This same event may occur in scarlet fever, though less frequently, as the insanity of scarlatina is more apt to be the outcome of a long series of organic lesions of kidneys and of other internal organs.

Another toxic origin of insanity is the general systemic poisoning in intermittent fever. The insanity and fever may replace each other vicariously. In fact mental alienation may be the chief, if not the only, objective symptom in "febris intermittens larvata."

It happens occasionally in attacks of acute rheumatism, that insanity suddenly develops itself at the same time that there is an intermission in the articular symptoms. It is then said that the disease has gone from the joints to the brain, and some speak of metastasis and of cerebral rheumatism in these instances. Waving all hypotheses, the clinical fact is, that the joint affection and the mental disorder may fluctuate with each other, so that there may be a remission of one or of the other class of symptoms. This was typically the case in a young woman under the writer's care, in whom active delusions and hallucinations appeared or vanished in accordance as the articular inflammation ceased or returned. It is more than likely that both these bodily and mental symptoms in rheumatism are due to a common toxic cause, and their vicarious interchange would seem to sustain this view.

In gout and in lithæmia psychic disturbances occur occasionally, and it is believed that they are due to excess of uric acid, and to other changes in the blood, constituting virtually a toxic condition, so far as the nutrient supply of the nervous centres is concerned. This condition is especially apt to arise in high livers past fifty years of age with podagrous heredity.

There are certain cases of insanity arising during the puerperal state, or soon after childbirth, which are considered to be of toxic origin. The mania is apt to be sudden and active and convulsions may occur and furnish additional support to the theory that the symptoms are due to a toxic state of the blood.

In a number of cases of puerperal fever, Bourget claims to have found highly toxic ptomaines in the urine, and the general severity of the symptoms in these cases corresponded with the degree of toxicity of the urine.

Insanity may be a sequel of the disease known as "la grippe." At least this was the direct and only exciting cause assigned in some cases which have come under the writer's care. It is known that in "la grippe," the meningeal, as well as the pulmonary membranes, may be the seat of inflammation, and all the symptoms are probably due to some special infection. Whatever the "materies morbi" may be, it is in some cases, as judged by its effects, distinctly toxic, and the resulting mental disorder may be considered as springing from the special morbific agent.

Cases of insanity from cancer have been reported. No case of this kind has come under the writer's observation, though it is not difficult to conceive, that in advance cases of cancer, there might be a reabsorption of septic material and a toxic occasion of psychic disturbance.

The mental diseases produced by the late lesions of syphilis are too well known to require mention here. The general constitutional infection by the luetie virus may be so severe as to derange the intellect, and the mental disorder thus arising is practically toxic in origin, and due to the systemic presence of the specific virus rather than to any pathological tissue changes.

Finally, there are auto-intoxications, which may cause mental disorders. Space will not permit more than a mention of the putrefactive alkaloids supposed to be formed by the action of bacteria on organic matter, and known as ptomaines, or of those basic substances, which result from metabollic changes in the bodily tissues, and which are called leucomaines. The main point is that these toxic substances may cause mental disease. It has long been known to physiologists that certain excretions contained substances poisonous to the organisms excreting them, and it is not a matter of surprise that auto-genous poisons should be found in the execretions of the human body.

Bouchard estimates that a sufficient amount of poisonous alkaloids are daily formed in the human "primæ viæ" to prove fatal if absorbed.

The albumoses are among the most powerful auto-genous poisons, and they have been found in the urine in cases of insanity by Köppen, who says that albumosuria is more common in these cases than peptonuria.

Two other investigators, Kollnitz and Fürstner, also report the frequent finding of albumose in the urine in cases of mental disease.

A number of writers might be cited to sustain the main view here advanced, that auto-genous poisons enter the circulation and act directly on the central nervous centres with sufficient toxic force to produce mental disorders.

It is to be hoped that the day is not far distant when these poisonous alkaloids will be isolated and studied as to their physiological effects, and as to their antidotes, so that at the same time that mental derangement from a special toxic agent is diagnosed, the antidotal remedy for the disease may be suggested.

The object at this time of thus presenting this summary review of the toxic origin of insanity, has been not so much to offer original material for the consideration of my expert hearers, as to call for an expression of skilled opinion on this important subject.

FRIEDREICH'S DISEASE ACCOMPANIED WITH TROPHIC TROUBLES IN AN EPILEPTIC.

Dr. Lzczypiorski gives the history of a case in the June number of "Annales Medico-Psychologiques," where Friedreich's ataxia was associated with symptoms quite foreign to the ordinary history of the disease. Friedreich's ataxia is a disease of early life, of long duration, hereditary, or at least a family disease, characterized by inco-ordination of movements, but with preservation of muscular strength and associated with disturbance of speech, nystagmus, a special deformity of the feet, and by the absence of pain, sensory and trophic troubles, and by the integrity of the intelligence.

A summary of the patient's condition, as described by L., is: Friedreich's ataxia, epilepsy, imbecility, trophic troubles, ataxic movements in general, tabetic gait, difficulty in speech, nystagmus, deformity of feet, preservation of muscular strength. absence of heredity. J. C.